VIRGINIA ELECTRIC AND POWER COMPANY
Surry Power Station
P.O. Box 315
Surry, Virginia 23883

January 19, 1990

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Serial No.: 89-062
Docket No.: 50-280
License No.: DPR-32

Gentlemen:

Pursuant to Surry Power Station Technical Specifications, Virginia Electric and Power Company hereby submits the following Licensee Event Report for Unit 1.

REPORT NUMBER

89-044-00

This report has been reviewed by the Station Nuclear Safety and Operating Committee and will be reviewed by Corporate Nuclear Safety.

Very truly yours,

M. R. Kansler
Station Manager

Enclosure

cc: Regional Administrator
Suite 2900
101 Marietta Street, NW
Atlanta, Georgia 30323

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1/1

POW 28-06-01

NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92

ESTIMATED BURDEN PER RESPONSE TO COMPLY WTH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Surry Power Station, Unit 1	0 5 0 0 0 2 8 0	1 OF 0 5

TITLE (4) Manual Reactor Trip/Turbine Trip Initiated Following Loss of Power to Semi-Vital Bus Caused by a Fault on "A" RSST

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
										0 5 0 0 0
1 2	2 1	8 9	8 9	— 0 4 4	— 0 0	0 1	1 9	9 0		0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check one or more of the following)* (11)			
POWER LEVEL (10)	1 0 0	20.402(b)	20.405(c)	X 50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER *(Specify in Abstract below and in Text, NRC Form 366A)*
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
M. R. Kansler, Station Manager	AREA CODE 8 0 4 3 5 7 - 3 1 8 4

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
X	T B	3 2	G 0 8 0	N							

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES *(If yes, complete EXPECTED SUBMISSION DATE)*	X NO				

ABSTRACT *(Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines)* (16)

On December 21, 1989 at 2156 hours with Unit 1 at 100% power, a manual reactor trip was initiated by the Unit 1 licensed control room operator (CRO). Loss of power to a semi-vital bus caused numerous control room alarms to annunciate and de-energized the control rod position indication system which resulted in erroneous indications of control rods inserting into the reactor. These indications prompted the operator to immediately initiate a manual reactor trip/turbine trip per approved procedures. Operators performed the appropriate plant procedures and quickly stabilized the plant following the trip. The loss of power to the semi-vital bus was caused by a fault on the "A" Reserve Station Service Transformer that isolated the transformer from the station's power distribution system. The transformer supplied the semi-vital bus through the 1J 4160V emergency bus. The fault was caused by material blown from the turbine building roof striking the primary leads to the transformer. The #3 Emergency Diesel Generator automatically restored power to the emergency bus seconds after the bus was de-energized. A four hour non-emergency report was made to the Nuclear Regulatory Commission per 10CFR 50.72.

1.0 Description of the Event

On December 21, 1989 at 2156 hours with Unit 1 at 100% power, a manual reactor trip was initiated by the Unit 1 licensed control room operator (CRO). Immediately prior to the trip, the operator observed numerous control room alarms (EIIS-ANT) and the reactor control rod Individual Rod Position Indicators (IRPI) (EIIS-ZI,AA) indicating near zero. He also noted that the control rod bottom lights had not illuminated and the reactor trip breakers' position lights indicated the breakers (EIIS-BKR) were closed. Seconds later, he observed that some rod bottom lights had illuminated and the reactor trip breakers had not opened. These indications prompted the operator to immediately initiate a manual reactor trip/turbine trip per approved procedures.

Following the trip, safety systems functioned as designed with the following exceptions. The main generator (EIIS-GEN) did not automatically trip following the turbine trip. The generator output breakers were manually opened approximately 200 seconds after the reactor/turbine trip. The Channel I source range nuclear instrumentation (NI-31) (EIIS-IG) failed to automatically reinstate and was manually reinstated. The channel II source range detector did automatically reinstate as designed.

The Unit 1 "A" Station Service (SS) (EIIS-EA) electrical bus, a non-emergency bus, was de-energized when the generator (EIIS-TB) output breakers (EIIS-BKR) were opened. Consequently, all equipment powered from this bus were de-energized including the "A" Reactor Coolant Pump (RCP) (EIIS-P,AB) and "A" Main Feed Pump (EIIS-P,SJ).

A four hour non-emergency report was made to the Nuclear Regulatory Commission per 10CFR50.72.

2.0 Safety Consequences and Implications

During the event, the turbine protection and reactor protection systems functioned as designed with the exception of failure of the generator to automatically trip following the turbine trip. The operator

manually opened the generator output breakers approximately 200 seconds after the turbine trip. This action was taken in accordance with approved emergency procedures when the breakers had not automatically opened as expected 30 seconds following the turbine trip. This delay was reviewed and it was determined that no damage occurred to the generator or the turbine. The #3 Emergency Diesel Generator (EDG) (EIIS-GEN,EK) automatically started and loaded onto the 1J emergency bus as designed to restore power to the bus. The two remaining RCPs continued to operate to provide sufficient flow through the reactor to ensure adequate core cooling while the reactor was shut down. There are no safety consequences associated with the de-energization of the "A" SS bus since the equipment powered from this bus is not required to ensure safe reactor shutdown or to mitigate the consequences of an accident.

In addition, other plant safety systems remained operable and plant parameters remained well within the bounds of the accident analysis. Therefore, the health and safety of the public were not affected.

3.0 Cause

The event was initiated by a fault on the primary leads to the "A" Reserve Station Service Transformer (RSST) (EIIS-XFMR). Insulating material, blown from the turbine building roof by high winds, struck a primary lead to the transformer causing it to contact a steel structural support member. The insulating material had been stored on the turbine building roof to support roof repairs in progress.

The fault resulted in a pilot wire differential lockout of the transformer, tripping and locking out the following breakers: Circuit breaker 152, the feed to the "A" RSST; Circuit breaker 15D1, "D" transfer bus feed; circuit breaker 15J8 Unit 1J 4160V emergency bus feed. It also locked out the following breakers; 15A1, Unit 1 "A" Station Service Bus alternate feed and 25A1, Unit 2 "A" SS bus alternate feed (see attachment I).

manually opened the generator output breakers approximately 200 seconds after the turbine trip. This action was taken in accordance with approved emergency procedures when the breakers had not automatically opened as expected 30 seconds following the turbine trip. ~~This action prevented any potential damage to the generator or turbine from occurring.~~ The #3 Emergency Diesel Generator (EDG) (EIIS-GEN,EK) automatically started and loaded onto the 1J emergency bus as designed to restore power to the bus. The two remaining RCPs continued to operate to provide sufficient flow through the reactor to ensure adequate core cooling while the reactor was shut down. There are no safety consequences associated with the de-energization of the "A" SS bus since the equipment powered from this bus is not required to ensure safe reactor shutdown or to mitigate the consequences of an accident.

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The "D" transfer bus (EIIS-EB) supplies the Unit 1 J 4160V emergency bus which in turn supplied the Unit 1 semi-vital bus (EIIS-ED). Consequently, isolation of the transformer resulted in de-energizing the Unit 1 semi-vital bus. The Unit 1 IRPI system and rod bottom lights are powered from the semi-vital bus. While the semi-vital bus was de-energized, the IRPIs indicated near zero with no rod bottom lights illuminated. Upon restoration of power to the emergency bus by the #3 EDG, power was restored to the semi-vital bus and the rod bottom lights illuminated. The delay of the IRPI response to indicate all rods out when power was restored was due to an inherent delay in the IRPI system circuitry output. A turbine runback initiated when the circuit sensed an IRPI dropped rod condition after power was restored to the rod bottom bistable.

Source range detector N-31 did not automatically reinstate due to operation of the detector's power supply crowbar protection circuit. The crowbar circuit in the high voltage power supply is designed to isolate power to the detector in the event of a power surge, however, it was not able to be determined whether a power surge actually existed to activate the circuit.

The generator trip by turbine trip logic is such that a turbine trip signal will initiate a generator trip (open the output breakers) after a 30 second time delay only if a reverse power condition is sensed. The main generator output breakers did not automatically open after the time delay following the turbine trip due to a faulty reverse power protection relay (GGP). Mechanical binding of the relay's directional unit prevented its proper operation and a reverse power (motoring of the generator) condition was not sensed.

4.0 Immediate Corrective Action(s)

Operators followed appropriate plant procedures to quickly stabilize the unit following the reactor trip. Also the Shift Technical Advisor performed the critical safety function status tree review to ensure specific plant parameters were noted and that those parameters remained within safe bounds.

5.0 Additional Corrective Action(s)

The roofing material was collected and secured, roof repairs were completed and all extraneous materials were removed from the turbine building roof.

The primary leads to the "A" RSST were inspected and damage determined to be insignificant. An additional insulator was added to each primary lead to stiffen the lead and prevent the lead from contacting support members. The pilot wire lockout signal was reset.

The fault GGP relay was replaced and testing was performed to determine the failure mode.

The protection device in the source range power supply was manually reset and the source range was reinstated.

6.0 Action(s) Taken to Prevent Recurrence

The source range detector N-31 failed to reinstate following a rector trip on July 9, 1989 due to its protection circuit actuation. An engineering evaluation of this circuit is still in progress.

The current protection scheme for generator anti-motoring will be reviewed to determine if any enhancements are required.

Current requirements to ensure that materials and equipment stored on site are properly secured were reviewed and determined to be adequate, therefore no additional corrective actions are required.

7.0 Similar Events

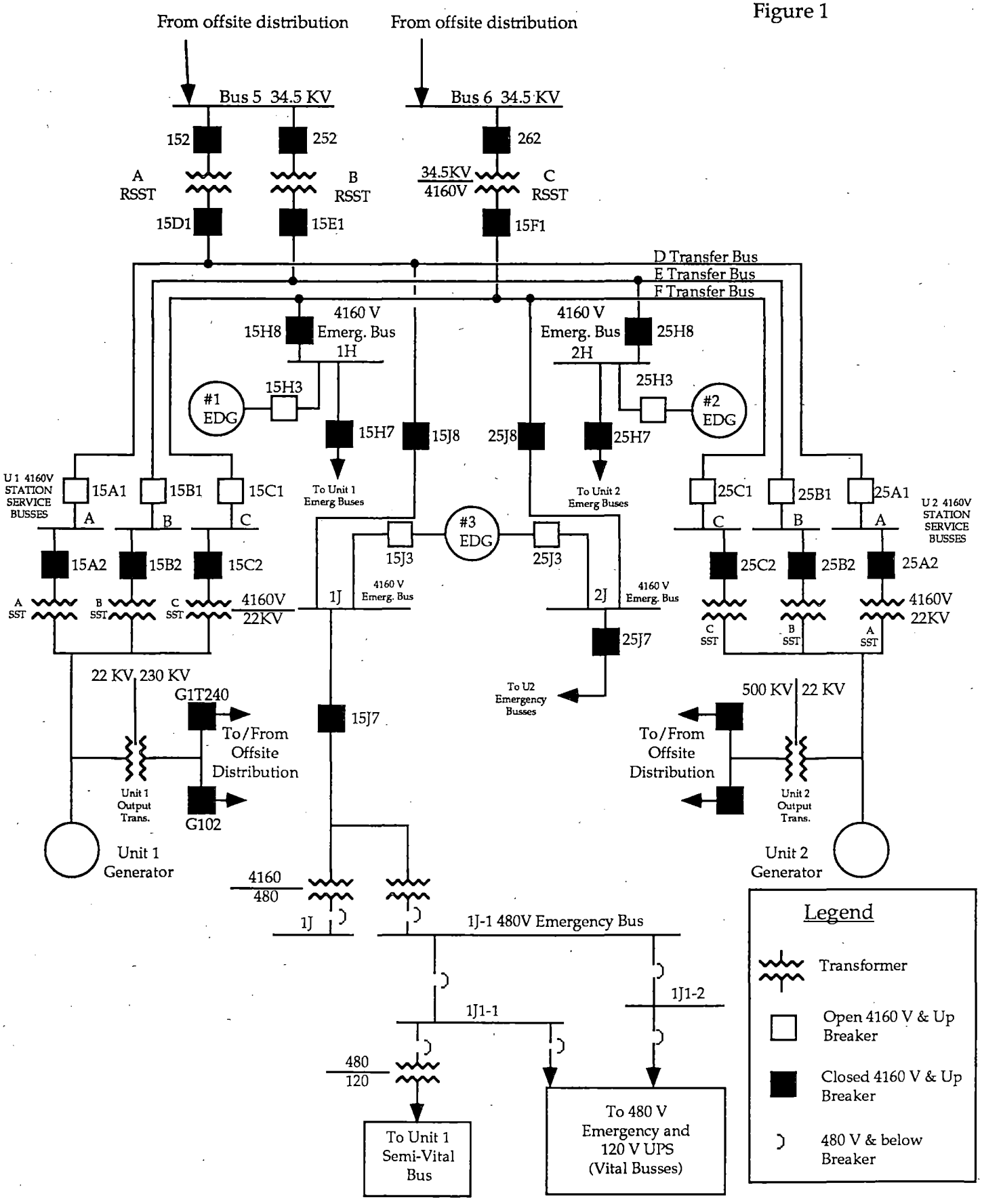
None.

8.0 Manufacturer/Model Number(s)

General Electric/GGP-53CIA.

LER 280-89-044
Attachment 1
Figure 1

BREAKER POSITION PRIOR TO EVENT



LER 280-89-044
Attachment 1
Figure 2

BREAKER POSITION AFTER EVENT
UNIT 1 GENERATOR OUTPUT BREAKERS OPEN